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AMBIENT AIR QUALITY SCENARIO IN AND AROUND DHAKA CITY OF BANGLADESH

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Abstract

Environmental problems in and around Dhaka city occur due to the lack of environmental facilities, such as infrastructure, coupled with the rapid growth in transportation. It is ascribed to the huge number of non-motorized and motorized vehicles on roads, lack of application of proper traffic management schemes, improper landuse planning, industrial growth, construction activities, resuspension of dusts, and open burning. This review is focused on the past situation of air pollution in and around Dhaka city, controlling strategies at that time to overcome the danger of air pollution, existing relevant air pollution, and present controlling measures, policies, laws, standards and regulations.

Keywords: Air quality, Pollutants, Particulate matter, Greenhouse gasses.

Introduction

Air pollution is a pressing issue in our country as Bangladesh ranks 169th (out of 178 countries) at the Environmental Performance Index for Air Quality (APT, 2016). The main sources of air pollution include emission from faulty vehicles, especially diesel run vehicles, brick kilns and dust from roads and construction sites and toxic fumes from industries. The main pollutants from gasoline powered internal combustion engines are carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), sulfur dioxide (SO_2),

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particulates of lead compound and unburned carbon particles. Emissions from diesel engines are smoke, CO, unburned carbon, NO_x and SO_2. According to the Department of Environment (DoE), the density of airborne particulate matter (PM) reaches 463 micrograms per cubic meter (μgm^{-3}) in the city during the dry season (December-March) - the highest level in the world (Air Pollution Reduction Strategy for Bangladesh, Final Report, 2012). World Health Organization (WHO) air quality guidelines (2005) recommend a maximum acceptable PM level of $20\mu gm^{-3}$, cities with $70\mu gm^{-3}$ are considered highly polluted. A study conducted by the scientists of Bangladesh Atomic Energy Commission (BAEC) revealed that about 50 tons of leads are emitted into Dhaka city's air annually and the emission reaches its highest level in dry season (November-January) (Air Pollution Reduction Strategy for Bangladesh, Final Report, 2012).

Poor ambient air quality is causing damage to human health, agricultural production and materials. It is high time to create awareness and motivation about air pollution across the country. In different times air pollution issues have been considered, and often guided by the multinational agencies like the World Bank (WB), Asian Development Bank (ADB), United Nations Environment Programme (UNEP), have taken measures or have made plans to reduce and control air pollution. The Department of Environment (DoE), the Government Agency entrusted with safeguarding the environment in Bangladesh, sought proposals to develop an 'Air Pollution Reduction Policy for Bangladesh' under the framework of the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Trans-boundary Effects for South Asia (Air Pollution Reduction Strategy for Bangladesh, Final Report, 2012).

Ambient air quality standards were first introduced in Bangladesh in 1997 under the environmental conservation rules (ECR) 1997. The Air Quality Management Project (AQMP) implemented by the DoE during 2000-2007 with support from the World Bank was the first major project aimed at air quality management in Bangladesh. The objectives of the AQMP included reducing vehicular emissions in the metropolitan areas, setting standards, enforcing pilot programs towards cleaner technologies, as well as implementing air quality monitoring and evaluation. This led to the revision of the ambient air quality standards of Bangladesh in July 2005. Other notable projects aimed at air quality management include certain components of the Clean and Sustainable Environment (CASE) Project supported by the World Bank, the Bangladesh Air Pollution Management (BAPMAN) Project, and the Implementation of Malé Declaration. The overall objectives of these projects focused to abate air pollution and introduce energy efficient technology for brick sector and vehicles.

Herein, the past and present scenario of air pollution and ambient air quality in and around the Dhaka city and the existing relevant air pollution controlling strategies, policies, laws, standards and regulations in Bangladesh have been reviewed thoroughly.

Air Pollution in Bangladesh

Air pollution is a serious environmental health hazard affecting the populations of Bangladesh. Air pollution of Bangladesh for outdoor and indoor is caused due to increasing population, associated motorization, industrial emissions, and use of biomass fuels during cooking with poor ventilation. Industries are mainly concentrated in major urban metropolitan areas such as Dhaka (The capital of Bangladesh), Rajshahi (Mango Village), the seaport cities such as Chittagong and Khulna, the inland port city Narayanganj, and other divisional towns. Obviously, the air pollution problem is more severe in all of the major cities in Bangladesh. Apart from unplanned industrial development in these areas, the severity of the pollution is increased mainly due to exhausts from two-stroke engine and diesel-run vehicles. In the rural areas of Bangladesh, the danger of air pollution not yet turns into a point of concern. This is due to less motorized vehicles and industries in rural areas (UNEP, 2001). The following Table 1 shows the ambient air quality standards in Bangladesh and their comparison with WHO and United States (US) standards (ADB, 2006). Agro based industries like sugar, pulp, paper, tanneries and value added industries like textile, garments, pharmaceutics, oil refineries, and fertilizer and chemical industries are also contributing for air pollution. The air pollution percentage of most five industrial sectors of Bangladesh in the year 2001 is shown in Table 2 (Faisal, 2001). Other than industrial emissions there are many brick-making kilns operated seasonally, mainly in dry season all over Bangladesh. More or less all of these kilns use coal and wood as their prime sources of energy, resulting in the emission of particulate matter, oxides of sulfur, and volatile organic compounds. Additionally to these usual sources of fuel, used rubber wheels of vehicles are also burnt, which produce black carbon and toxic gases. These are harmful for health (UNEP, 2001). Occurrence of choking smells and irritating eyes are common (Shakeel, 2011, Khaliquzzaman, 1998). The tremendous force of population has made it almost unfeasible to maintain a clean environment in the capital city of Dhaka (UNEP, 2001). Dhaka has been identified as the second worst city to live for the second consecutive time, according to a survey of Economist Intelligence Unit (EIU) affiliated with the UK-based weekly Economist. The listing was based on 30 factors across five broad categories: stability, healthcare, culture and environment, education and infrastructure. The survey factor were rated as accepted, tolerable, uncomfortable, undesirable or intolerable in a system that "allows for direct comparison between locations," according to the report (Daily Star, 2011).

Table 1. Ambient air quality standards in Bangladesh from July 2005 and their comparison with WHO and US standards*.

Pollutant	Pollutant (observation realized)	Bangladesh standard (μgm^{-3})	WHO guideline (μgm^{-3})	US standard (μgm^{-3})
Carbon Monoxide (CO)	8 hr	10000	10000	10000
	1 hr	40000	30000	40000
Lead (Pb)	Annual	0.5	0.5	0.15
NO_x	Annual	100	-	-
SPM	8 hr	200	-	-
PM10	Annual	50	20	-
	24 hr	150	50	150
PM2.5	Annual	15	10	15
	24 hr	65	25	35
Ozone O_3	1 hr	235	-	235
	8 hr	157	100	157
Sulpher dioxide	24 hr	80	-	78

*PM = Particulate matter in micron; Suspended particulate matter.

Table 2. Air pollution percentage of most five industrial sectors of Bangladesh in the year 2001.

Industry	Emission (ton y^{-1})	Pollution (%)
Food Industry	146,356.06	38.7
Cement/Clay	62,725.88	16.6
Pulp and Paper	51,963.92	13.7
Textile	39,831.01	10.5
Tobacco	16,992.22	4.5

Ambient Air Quality in Dhaka City

A study of impact of auto-exhaust on air quality of Dhaka city has been conducted in the year 2000, it is revealed that traffic congestion, fuel quality and brick field emission are the main reasons of air pollution in Dhaka City (Begum, 2004).The ambient air quality of Dhaka city with respect to CO, SO_2, NO_x, CO_2 and PM10 is summarized in Table 3 (Ahmed *et al.*, 2010).

Table 3. Ambient Air Quality of Dhaka City.

Location	Pollutant's concentrations				
	CO (μgm^{-3})	NOx (μgm^{-3})	SO_2 (μgm^{-3})	PM10 (μgm^{-3})	CO_2 ($\mu g\ g^{-3}$)
Mohakhali	2,519	376	Trace	547.66	435
Farmgate	7,730	752	Trace	289.92	590
Mogbazar	5,726	339	Trace	383.53	475
Sonargaon	3,435	75	Trace	161.93	500
Science Lab	5,726	113	Trace	167.64	500

Note: Amended Bangladesh Standards [ECR, 2005]

SO_2: 365 μgm^{-3} (24-hour average)

CO: 10000 μgm^{-3} (8-hour average)

NO_x: 100 μgm^{-3} (Annual)

PM10: 150 μgm^{-3} (24-hour average)

Contributors for Air Pollution in Dhaka City

Emission from vehicles

Dhaka has been rated as one of the most polluted cities of the world. The contribution of air pollution by different types of vehicle and the amount of pollutants emitted from vehicles in Dhaka city is shown in Table 4 (JICA, 1999).

Table4. Contribution of air pollution by vehicle type.

Type of vehicle	CO (%)	HC (%)	NO_x (%)	PM (%)	Annual growth
Truck	13.4	8.6	59.7	47.5	7.8
Bus	10.3	9.7	18.5	29.4	2.5
Mini bus	7.3	3.9	6.5	19.1	6.8
Utility	6.3	4.4	2.8	0.7	10.2
Car	38.2	18.2	6.5	1.2	9.4
Three Wheeler	10.6	26.9	6.0	1.2	31.0
Motor Cycle	14.0	28.3	0.3	1.0	8.1

Lead (Pb)

Lead was identified as a major health hazard in Bangladesh as early as 1980s (Khan *et al.,* 1980) when an average blood Pb concentration of 55±18 μgdL^{-1} was observed in a group of 100 adults in Dhaka. In early 1990s, tests confirmed the presence of Pb in ambient air in Dhaka, and petrol additives were identified as a major source. At present, air quality standard in Bangladesh for Pb concentration in ambient air is 0.5 μgm^{-3}. Recent test results show that Pb concentration in ambient air in Dhaka comfortably achieves the standard (Begum and Biswas, 2008). In fact, these results show that the current ambient Pb concentration nearly meets the U.S. EPA standard (0.15 μgm^{-3}), however, caution must be exercised in interpreting the numbers since these tests considered the Pb contained within the fine PM (PM2.5) only. Comparison of these results with earlier ones shows that the total ambient Pb concentration can be approximately 57% more when Pb in coarse PM (PM2.5-10) is also considered in Table 5 (Begum and Biswas, 2008 and Biswas *et al.,* 2003).

Table 5. Ambient Pb concentration in Dhaka.

Year	Study 1 Pb in PM2.5 (μgm^{-3})	Study 2 Pb in PM2.5 (μgm^{-3})	Study 3 Pb in PM2.5 (μgm^{-3})	Ratio of Pb in PM10 to Pb in PM2.5
1994		0.312±0.485	0.522±0.614	1.67
1997	0.265±0.549	0.256±0.532	0.461±0.775	1.80
1998	0.370±0.644	0.370±0.636	0.507±0.669	1.37
1999	0.225±0.370	0.225±0.370	0.342±0.420	1.52
2000	0.106±0.179	0.106±0.179	0.160±0.192	1.51
2001	0.130±0.163	-	-	(average 1.57)
2002	0.227±0.784	-	-	-
2003	0.166±0.467	-	-	-
2004	0.198±0.611	-	-	-
2005	0.102±0.207	-	-	-

The current share of Pb in coarser particles could actually be higher since the current Pb in ambient air possibly does not come from fuel combustion, which generally produces fine particles. This indicates that Pb concentration in ambient air is likely to be larger than the current U.S. EPA standard, but possibly is still reasonably below the Bangladesh standard. It should be noted that Pb is not continuously measured at the CAMS established by the DoE in different cities of the country.

Particulate matters (PM)

It is widely accepted that particulate matter is the major pollutant of concern internationally and in Bangladesh (ADB, 2006; UNEP, 2012). Various regulatory impact studies (USEPA, 2007) shows that among the criteria air pollutants, PM2.5 has the most harmful impact on health. In recent times, the adverse effects of black carbon (BC), a major component of soot, has attracted much attention (WHO, 2012; UNEP, 2011). Black carbon and other particulates are emitted from many common sources, such as diesel cars and trucks, residential stoves, forest fires, agricultural open burning and some industrial facilities. Although Bangladesh was one of the first few countries in Asia to enact a PM2.5 standard for ambient air, the achievements on the compliance of this and other particulate related standards are poor. Consistent and coherent source for time series information on SPM or PM concentrations in ambient air are also not available, since the Continuous Air Monitoring Station (CAMS) of the Department of the Environment (DoE) at Shangshad Bhaban in Dhaka started operating in 2002 (partially operative during 2007-2010); the other CAMS in Dhaka (BARC) has been operating since 2008. Although there is limited time series data to conduct a proper trend analysis, it does appear that the particulates concentration in Dhaka did not increase significantly in the recent years, despite a large increase in vehicle numbers during that period. Conversion of vehicles to run on CNG has largely contributed to the reduction of PM emissions and the relatively stable ambient concentrations.

Nitrogen dioxide (NO_2)

Nitrogen Dioxide (NO_2) has some health impacts and is a well-known precursor to acid rain, which can reduce agricultural production and damage the environment (UNEP, 2012). NO_2 is also a precursor for the formation of particulates and O_3 in the atmosphere. Lack of a proper time series, and data gaps even within the 3-year period, make it difficult to ascertain the trend of ambient NO. However, it appears the annual average ambient concentrations for NO_2 are below the national AQS for all the cities, indicating that NO_x is not a pollutant of serious concern at the moment. Major sources of NO_x emissions are motor vehicles, power plants and other combustions sources.

Sulfur dioxide (SO_2)

Sulphur dioxide (SO_2) has health impacts as a gas and also acts as a precursor to the formation of particulates and acid rain in the atmosphere. SO_2 emissions occur primarily from combustion of sulphur containing fuel (coal, diesel). In Bangladesh, diesel vehicles and brick kilns are the most important sources because of the presence of sulphur in commercially available diesel and coal. Similar to NO_x, ambient SO_2 concentration from the CAMS monitors of three cities are presented the current ambient concentrations are significantly lower than the AQS and ambient SO_2 is not of significant concern at the moment. It is possible that SO_2 concentrations exceed the AQS at pollution hot spots, but at the moment, comprehensive data on hot spots remains unavailable.

Ozone (O_3)

Ozone (O_3) in high concentrations at the ground level can be a significant health hazard, resulting in premature mortality. Ozone can also reduce agricultural productivity significantly by hindering plant growth (GEO5, 2012). Unlike particulates, NO_x or SO_2, O_3 is not directly emitted by any source, but is produced in the atmosphere when emissions of volatile organic compounds and NO_x from different sources react in the presence of sunlight.

Carbon monoxide (CO)

Carbon Monoxide CO is produced due to incomplete combustion and, exposure at very high levels can cause death. Major sources of CO in urban areas are motor vehicles. Ambient CO concentrations from the CAMS at three cities in Bangladesh (Source: DoE) reveal no significant concern regarding outdoor CO pollution. However, CO pollution can be significant in indoor atmosphere, especially in the rural areas where use fuel wood and other solid fuels are used for cooking.

Indoor pollutants

Indoor air pollution (IAP), resulting primarily from combustion of biomass (e.g., firewood, animal dung, crop residue) and fossil fuels (e.g., kerosene) in traditional cooking stoves in rural areas and urban slums, is a major concern in Bangladesh as well as many other developing countries. IAP causes acute respiratory infections, which is major cause of death of young children in developing countries. Through respiratory infections, IAP has been estimated to cause between 1.6 and 2 million deaths per year in developing countries (Smith *et al.*, 2004), primarily affecting children in poor households. In fact, women and children in the developing countries are disproportionately exposed to polluted air due to use of biomass/fossil fuels for cooking and heating (World Bank, 2010). It has been argued (Dasgupta *et al.*, 2006b) that in biomass using households in Bangladesh, IAP may be much worse than outdoor pollution, and health risks may be severe for household members who are exposed to IAP for long periods during the day. In Bangladesh, only limited data are available on indoor air quality (Dasgupta *et al.*, 2009; Khaliquzzaman *et al.*, 2007). Dana (2002) found that concentration of SPM in kitchen environment in Gazipur and Dhaka slum areas ranged from 4,040 to 39,192 mgm^{-3}. Alauddin and Bhattacharjee (2002) found concentration of SPM in a poorly ventilated rural kitchen (5,032 mgm^{-3}) in Dhamrai, Manikganj to be much higher than that in a well-ventilated rural kitchen (3,670 mgm^{-3}). Under average conditions, Bangladeshi households using “dirty” fuels can experience 24-hour average PM10 concentrations as high as 800 mgm^{-3} (Dasgupta *et al.*, 2006b), against an acceptable level of 150 mgm^{-3} (U.S. EPA, 2006). Dasgupta *et al.* (2006a) reported significant regional variation in indoor air quality depending on local differences in fuel use and, more significantly, construction practices that affect ventilation.

Brick fields

Numerous brick-making kiln operating in the dry season are one of the major sources of air pollution in Dhaka city. From Table 6 (Ahmed and Hossain, 2008), it has been noticed that the concentration of SPM is higher than the Bangladesh standard value for SPM (400μgm^{-3}) and other pollutants level are within the limit.

Table 6. Pollutants levels around brickfield in Dhaka city.

Place	Concentrations of the Pollutants			
	CO ($\mu g\ m^{-3}$)	SO_2 ($\mu g\ m^{-3}$)	HC %	SPM ($\mu g\ m^{-3}$)*
Edge of the cluster	2863	131	0.01	780.7
Center of the brickfield cluster 1	2978	157	0.02	1390
Center of the brickfield cluster 2	3207	157	0.01	728.5

*Suspended particulate matter

Effect of air pollution

Health Effects

People exposed to high enough levels of certain air pollutants may experience: irritation of the eyes, nose, throat, wheezing, coughing, chest tightness, and breathing difficulties, worsening of existing lung and heart problems, such as asthma, increased risk of heart attack. In addition, long-term exposure to air pollution can cause cancer and damage to the immune, neurological, reproductive, and respiratory systems. In extreme cases, it can even cause death.

While the total burden of disease in Bangladesh is comparable to other South-East Asian countries with high mortality rates, the share attributable to respiratory infections and disease is about one third higher than the average for these countries, and the proportion caused by diarrheal disease is almost double the average. Since both are associated with poor environmental conditions, the relatively higher prevalence of respiratory infections and diarrheal disease highlights the importance of focusing attention on environmental quality in Bangladesh.

Environmental effects

Air pollution can cause a variety of environmental effects: acid rain is precipitation containing harmful amounts of nitric and sulfuric acids. These acids are formed primarily by nitrogen oxides and sulfur oxides released into the atmosphere when fossil fuels are burned. These acids fall to the Earth either as wet precipitation (rain, snow, or fog) or dry precipitation (gas and particulates). In the environment, acid rain damages trees and causes soils and water bodies to acidify, making the water unsuitable for some fish and other wildlife. It also speeds the decay of buildings, statues, and sculptures that are part of our national heritage.

Eutrophication is a condition in a water body where high concentrations of nutrients (such as nitrogen) stimulate blooms of algae, which in turn can cause death of fish and loss of plant and animal diversity. Air emissions of nitrogen oxides from power plants, cars, trucks, and other sources contribute to the amount of nitrogen entering aquatic ecosystems. Haze is caused when sunlight encounters tiny pollution particles in the air. Haze obscures the clarity, color, texture, and form of what we see. Some haze-causing pollutants (mostly fine particles) are directly emitted to the atmosphere by sources such as power plants, industrial facilities, trucks and automobiles, and construction activities.

Effects on wildlife

Toxic pollutants in the air, or deposited on soils or surface waters, can impact wildlife in a number of ways. Like humans, animals can experience health problems if they are exposed to sufficient concentrations of air toxics over time. Studies show that air toxics are contributing to birth defects, reproductive failure, and disease in animals. Persistent toxic air pollutants (those that break down slowly in the environment) are of particular concern in aquatic ecosystems. These pollutants accumulate in sediments and may biomagnify in tissues of animals at the top of the food chain to concentrations many times higher than in the water or air.

Ozone depletion

At ground level, ozone is a pollutant that can harm human health, in the stratosphere, however, ozone forms a layer that protects life on earth from the sun's harmful ultraviolet (UV) rays. But this "good" ozone is gradually being destroyed by man-made chemicals referred to as ozone-depleting substances, including chlorofluorocarbons, hydro-chlorofluorocarbons, and halogens. These substances were formerly used and sometimes still are used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. Thinning of the protective ozone layer can cause increased amounts of UV radiation to reach the Earth, which can lead to more cases of skin cancer, cataracts, and impaired immune systems.

Crop and forest damage

Ground-level ozone can lead to reductions in agricultural crop and commercial forest yields, reduced growth and survivability of tree seedlings, and increased plant susceptibility to disease, pests and other environmental stresses (such as harsh weather). Crop and forest damage can also result from acid rain and from increased UV radiation caused by ozone depletion. UV can damage sensitive crops, such as soybeans, and reduce crop yields.

Global climate change

The Earth's atmosphere contains a delicate balance of naturally occurring gases that trap some of the sun's heat near the Earth's surface. This "greenhouse effect" keeps the Earth's temperature stable. Unfortunately, evidence is mounting that humans have disturbed this natural balance by producing large amounts of some of these greenhouse gases, including carbon dioxide and methane. As a result, the Earth's atmosphere appears to be trapping more of the sun's heat, causing the Earth's average temperature to rise - a phenomenon known as global warming. Many scientists believe that global warming could have significant impacts on human health, agriculture, water resources, forests, wildlife, and coastal areas.

Air Pollution Reduction Policy in Bangladesh

The proposed methodology for developing the air pollution reduction policy/strategy follows the general USEPA guidelines (USEPA, 2011). There are four main steps in developing an air pollution control strategy (Air Pollution Reduction Strategy for Bangladesh Final Report, 2012):

1. *Determine priority pollutants:* The pollutants of concern depend not only on the health (or reduced agricultural output), but also on the severity of the air quality problem in the region.

2. *Identify control measures:* For specific emissions source categories, the appropriate controls for the priority pollutants are identified. This segment primarily deals with the technological solutions.

3. *Incorporate the control measures into a strategy/policy*: Once the control measures are identified, a regulatory program is proposed such that the control strategies are formalized. This section primarily deals with policies aimed at adoption of the technologies mentioned above.

4. *Involve the public:* It is important to involve the community and other affected parties, during the development of the policy or strategy. Early consultation reduces later challenges.

For the first step, it is important to have a comprehensive spatially and temporally disaggregated emissions inventory identifying the contribution of different emission sources. Unfortunately no such emissions inventory is available, although DoE has developed an aggregate emissions inventory under the Malé Declaration for 2000. Unfortunately, this inventory does not capture the required spatial or temporal resolution, and there are issues with the activity data and emissions factors. In order to link steps 2 and 3, there are three primary considerations: Environmental, Engineering and Economic. Both, the cost of individual control measures (technologies), and the cost of the strategy (regulation, command and control, market based instruments, etc.) are important in this regard. However, there is a lack of quantitative information in order to carry out a quantitative evaluation of the strategies. The dearth of information about ambient air pollutants concentration trends, emissions inventory, existing technological landscape and costs of control, the above methodology has been modified and the following describes the simplified work breakdown:

1. Determine current status of air pollution in Bangladesh emphasizing on highly polluted cities;
2. Review of the emissions inventory compiled by the DoE and suggests modifications, if necessary;
3. Based on 1 and 2, identify the key air pollutants that require action;
4. Review of international literature on air pollution control strategies (technologies) and their effectiveness from environmental and engineering perspectives;
5. Collect existing relevant air pollution strategies, policies, laws, standards and regulations in Bangladesh;
6. Review the evidence (based on published literature) of the impact of previous policies, strategies on air quality in Bangladesh and of potential co-benefits of strategies with respect to GHG emissions;
7. Collect government plans and projections on industrial and transport developments over the next few years, especially on coal based power plants, highways, public transportation and brick industries;
8. Review of international literature on policies and strategies to reduce air pollution and their effectiveness and economic efficiency;
9. Based on 5 to 8, identify the key control strategies for Bangladesh and potential policies to help implement the strategies;
10. Incorporate feedback from stakeholders and update the report;
11. Prepare the draft final report for Client's feedback;
12. Prepare final report incorporating feedback from Client/ Reviewers.

Conclusion

This review presents a clear picture of air pollution trend in and around Dhaka, Bangladesh from past to present, its major causes and effects and promotes a green agenda for the people of Bangladesh and identifies that an integrated approach is required to improve the overall environment of the country. Several recommendations are made to improve the air quality, most important of which are:

- Coordination among development partners is necessary to avoid duplication of approaches.

- Not allowed any sorts of two stroke-engine vehicles.
- Reduce lead and sulfur content of fuel in well-planned way.
- Conversions of urban traffic fleets to natural gas.
- Appreciate transport infrastructure development in private finance.

The challenge for the government of Bangladesh is to understand the transportation as well as the pollution problem, which has been deteriorating the human life. The real challenge is to take immediate action programs for controlling air pollution in Bangladesh.

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